/480 cont./

411 shape and usually an almost rectangular tang (Fig. 39); the latter is inserted into the notch. Of decisive importance is the longitudinal measurement, for it is usually more than twice as much as a point on the arrow shaft. The former does not seem suitable for an arrowhead because of its size and weight. Since, moreover, it is fastened to a short stick, I regard the designation "dagger" as suitable for this weapon. It is also handled as such. A man grasps [225] the back third of the shaft and stabs toward a sea lion that he meets on land. He attacks it from the front, never from the side, and can get close enough to it without being bitten to thrust the dagger into its neck.

For the dagger points the natives formerly chose flat lamina of [177] black slate and greenish jasper; in modern times they prefer thick bottle-glass that is more easily worked. The edges of the glass

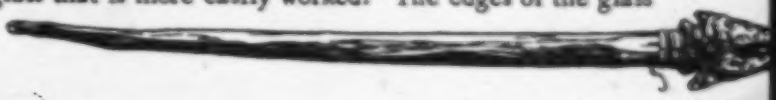

Fig. 38. The Dagger. One-third natural size.

dagger-points cut more sharply, but become dull more quickly. Continuous splintering under pressure with a short bone stick produces /481/ the form with the sharp edges and thick point. On my [126] second expedition, old Alfredo made me a dagger with a long glass point and with a total length of 48 centimeters (188). This

188. This piece is today preserved in the Museo Histórica at Santiago de Chile. See the observations made by Hyades (q):360 with the Indian named Yakaif.

enabled me to see how it was made and at the same time to learn in detail how it is actually manipulated.

From the dagger to the lance is only a short step. Sometimes it, too, has a large, heavy point in the form of a triangle. It must [172] come as a surprise that laurel-leaf forms of the /Fig. 39 appears here/ most frequent surface-finds on Isla Grande (Vol. I, 263) have to this day been found only very sporadically throughout the broad Cape Horn Archipelago. This lance is used in the same way and for the same

[Text continues on page 172.-Analyst]

/495 cont./
412 beech. It is about the length of a finger and is regularly used by all the women and girls for plaiting their small baskets (206).

[172]

206. Spencer:134 gives a detailed description of three bone awls that came from an old shell mound on Navarino Island. One of them is made from the bone of a young mammal.

With this punch small holes are pierced either into leather that is to be put together for cloaks and covers, bags, and pouches, into the bark pieces of a canoe, or in a scoop that is to be sewn together. In the most recent times the Yamana have
412 learned to make a genuine shoemaker's awl. They file off the
177 head of an iron nail the length of a finger and set this end into a short, cylindrical handle of wood; the other end is filed to a point. This punch, wájkul, penetrates leather and bark much more quickly, of course, and the people like to work with it (207). It must be specifically mentioned that drills have been

207. Lehrop (b):142 illustrated two of these modern pieces.

unknown to the Fiegians from ancient times; they are therefore unable to make holes in a piece of wood. For this purpose they have in most recent times used an iron nail which they obtain from Europeans.

/496/ δ. Wedge and Hammer

412 It is not at all seldom that a man must use a wedge of bone. It becomes absolutely necessary when he cuts out the bark pieces from a beech trunk for his canoe. This simple and yet valuable piece has been described on page 111 (Fig. 26) (208). The bone

208. Other illustrations are found in Hyades (a):Plate XXXII, 9, and in Spencer: 139.

/596 cont./

G. The Shell Heaps

172 Throughout the region of the Yamana there are mound-shaped accumulations of mussel shells, varying in height and length. It is unimportant whether or not they are designated as actual kitchen middens. Whether they can raise any claims to being deposits of archaeological finds is uncertain (389). Of real factual value is

389. Cooper:218 prefers to avoid this conception, for "it may be a little inaccurate to use this heading archaeology in the case of the meager remains obtained from Fuegia graves and middens" /cited in English/. South American observers use the terms "Conchales" and "Kjökkenmöddinger" somewhat indiscriminately.

a detailed description of the site of these shell heaps and all the implements that are preserved in their various layers. This shows without any doubt that the former way of living, insofar as it can be recognized from these deposits, coincides in general and in detail with the present form and that the people of those times and of the present day belong to the same race.

1. Their Arrangement

In this description we shall include not only the few very large shell heaps that were built up in isolated places, but also the insignificant dwelling sites which were still used during the last decade. /597/ The fact that Indian families built their huts on them up to the present time points definitely and clearly to the similarity of living habits between then and now (Fig. 70).

172 361 It is very easy for any traveler to establish the fact that there are shell heaps to be found in all parts of the Cape Horn Archipelago. They reveal certain differences, however, In general they are not as large and extensive in the west as in the east, for obvious reasons. Except for inlets, large and small, the western

/597 cont./

172
361

shores are everywhere steep, although they are not always very high. /Fig. 70 appears here./ Hence the Indians could build their huts only in places with a very low, flat, and usually narrow shore-line. Whatever they left behind was washed away by temporary high tides. Afterwards the shingle revealed hardly any traces of the fact that shortly before one or more families had camped there. In inlets with sloping and wide shores, accumulations of food remains are not entirely lacking even in the west, as I myself have seen in different places. They are limited in extent, however, by the rock walls which are close together and rise steeply. Since these heaps are sometimes crowded against the rock walls, a thick layer of earth washed down by the rain covers them in the course of time. Some of them are entirely covered and can be seen only

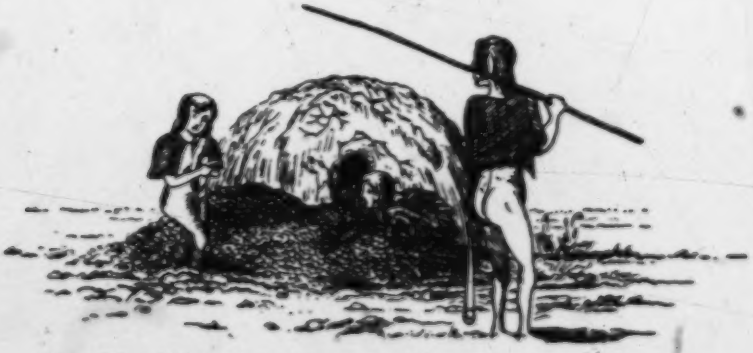

Fig. 70. Oldest Representation of a Shell Heap.

by the careful observer. In contrast to this, the eastern half of the Cape Horn Archipelago has many wide beaches. Whatever piled up and accumulated here remained almost intact and the amount of it gives the present-day visitor food for thought. The fact that in the formation of the shell heaps in the east and west there was a slight difference in diet will soon be discussed.

To begin with, we cannot expect that those deposits extend uninterruptedly along the entire shore-line. We find them only /598/ here and there. Moreover, it is obvious that whole hills have been formed in sheltered places that offered greater security and quiet for a dwelling, whereas on the exposed beach the deposits were extensive but low. It was the desirability of the

/598 cont./

172 361 site alone that was more or less attractive and invited more or fewer families to settle there, by no means the greater supply of mussels in one place or another (390). The shells themselves were

390. Lothrop (b):178 confirms that the heaps of refuse "are found in sheltered places, where there is a beach for landing, kelp off-shore for mooring canoes, and where water and fire-wood are readily available" /cited in English/. Compare also the geographic distribution of shell heaps in Furlong (r):180. Vignati (c): 85 has indicated on a special map the "Conchales" at Ushuaia and on the eastern coast of Isla Grande.

gathered not only at the place where today large amounts of refuse are lying, but many were also brought along to the place where the hut was to be erected, and the people often went great distances from it looking for mussels if they wished to stay longer at the same spot. The bays and hidden inlets in favorable locations were regarded and are today still regarded as favorite spots by many families. They not only frequently returned to such places, but remained in them longer than elsewhere. One was safe there from the strength of the winds and also found a flat shore-line on which to pull up the canoe. Moreover, firewood and drinking water were easily available. The cup of benefits was filled if the outlying sea floor was shallow and considerably facilitated occasional fishing.

172 The shores of Bahía Harbertón and their environs were an advantageous spot from every standpoint. A few huge mounds are to be found on Gable Island opposite it, and Tierra Mayor, and there are two more in Puerto Róbalo, which are far surpassed in size by those in Puerto Mejillones. Less extensive than the latter are those that I saw on Pictón Island and in Puerto Rosa, Puerto Piedra, Wulaia, at the mouth of the Río Douglas, and in Ushuaia Bay.

All this explains the differences in length and height of the shell heaps, kusimé'a, but in their formation they are completely uniform. All of them form a low, gently sloping, more

/598 cont./

172 or less long hillock. In those that are pushed up close to the water line, the shore side is sometimes much steeper than the land side. An explanation for this shape is not necessary. All shell mounds were built up in layers; hence inevitably the lower layer was from time to time enlarged. Just as in the early beginnings, if I may express myself thus, individual dwellings were placed close together, so also later on, hence the lateral expansion of each individual hillock and a progressive narrowing as it grew in height. On the top one can today see, at short intervals, ring-shaped depressions which in size indicate the groundplan of a dwelling. A distinct, worn footpath leads from this ring to the fresh-water spring /599/ in any direction or to the beach where one can easily make out the place where the canoes were pulled up and safely moored.

The greater the length of the shell heap and the more it expands laterally in one spot or another, the greater is the number of dwelling sites for individual families. In some places the groundplan is well preserved, but usually the edges are flattened out, which makes the central shallow depression less recognizable. In some places the latter is sharply and clearly outlined by the thick growth of grass that fills it (391). We are indebted to

391. According to Lothrop (b):179, "the surfaces of the middens reveal on top a series of pits which represent house-sites. These pits are from ten to 15 feet in diameter, anywhere up to six feet deep, and are circular in outline" /cited in English/.

Furlong (r):178 for the first detailed descriptions. He drew the "approximate plan of Woolyis on Navarin Island" /cited in English/, on which the individual sites of settlement were clearly indicated. /Fig. 71 appears here./ Lothrop (b):184 carefully inspected the shell heaps that are most easily reached. For example, in the entire Bahía Harberton area he counted 52 campsites with a total of 1,216 sites of family huts -- of the latter 367 in Bahía Cambaceres alone (Fig. 71); in Puerto Mejillones, including Puerto-Piedra, seven campsites with a total of 253 hut sites; in Puerto Ribalo on each of the two long shell mounds,

/599 com./

172 43 and 56 family-hut sites, respectively. Since now, as then, safe inlets and sheltered nooks are still sought, the present-day Yamana erect the framework of their dwelling in exactly the same depressions used by many previous generations. For their part they are still adding to the shell heaps.

Besides the shell mounds that have kept their shape, there are /600/ some that have been more or less leveled by the active traffic of Europeans and the trampling of cows, sheep, and horses. We can clearly recognize this condition at the mouth of the Rio Douglas and in some places in Puerto Mejillones. Accordingly, the number of dwelling sites here was formerly greater than that just mentioned. The condition that animals and human beings have brought about here was achieved in other places, which

[102]

Fig. 71. Shell Heaps near Bahía Harberton.

were ruthlessly exposed to the winds, by inanimate nature. I am referring to many areas between Ushuaia and Punta Remolino. Here the many shell mounds appear scattered in all directions, mixed with much drifting sand, and now form a uniform layer, as though all the many patches had never been gathered together in a mound-shaped elevation and remained thus for some time.

Now it is no longer surprising that the depth of the layers fluctuates remarkably from place to place. Along the areas just mentioned the very uniform layer goes only to a depth of ten to 30 centimeters, proof that only a few families settled here and these much more seldom than elsewhere. On the other hand,

/600 cont./

172 other places were very often visited. For example, in Puerto Mejillones and in Puerto Róbalo long mound ridges were built up to a height of four meters and more. We can easily measure the depth of the shell mounds in those few places where the sea has washed away one side of the heap (Fig. 72).

172 133 From these occurrences, which are after all rare, Lothrop (b):195 concluded that the earth has settled since the first habitation. Contrary to this completely unauthoritative view, it is certain that this region underwent a post-glacial relative upheaval (392). Whether this is continuing in the present time and

392. Naturally we are referring here to the geologically latest post-glacial surface fluctuations. Unfortunately very little is known about them, and long-term soundings have not been undertaken in Tierra del Fuego. Thore G. Halle ("On Quarternary deposits and change of level in Patagonia and Tierra del Fuego," Bulletin of the Geological Institute Upsala, Vol. 9, 1910) mentions elevated terraces six meters above sea level along the shore on the north side of Gable Island. J.G. Andersson also observed these at other places along Beagle Channel at a height of three and a half meters. Finally, O. Nordenskjoeld described terrace ten meters high at Ushuaia. They are all post-glacial phenomena, and their upthrust is very slight.

subsequent to the deposit of the lowest shell-heap strata has by no means been proved for Tierra del Fuego (393). Possibly an argument

393. In this interpretation of the age of the Beagle Channel shell mounds, I am relying on the trustworthy decision of Professor Dr. O. Schmieder of Kiel who, in reply to my request, gave the following additional information in his letter of March 18, 1933:

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133

/600 cont./
"In the present state of our knowledge we cannot definitely say whether the coast is rising, sinking, or remaining level. The land has been post-glacially elevated, but these recent upheavals proceed very slowly, and it remains to be determined whether or not the movement has continued in the last few centuries."

Since I have not personally made careful investigations of the height in relation to sea level of shell mounds farther away from the water line, my conjecture that the above-mentioned minor circumstance possibly argues for an upheaval does not definitively settle this question. Earlier, Nordenskjoeld (f):216 stated the following view: "When the glacial period ended, Tierra del Fuego was only about 60 meters lower than it is now. It rose after that, but now the upthrust seems to be slight or not going on at all."

in favor of it is that in some places along open and /601/ flat coasts the shell heaps lie far away from the water line and a wider beach may have formed later on. There are no tangible reasons why the earlier Indians should have built their huts as far from the water line /Fig. 72 appears here/ as the shell mounds are now to be found. In any case whether or not the insignificant factor mentioned above indicates an upheaval, there is nothing that proves the land has settled. In those places lying farther back, however, the advantage for research is that at least the actual depth of the mussel stratum becomes clearly visible. The fact that in the case of individual mounds some lateral walls facing the water have been undermined and eroded is, contrary to Lothrop's conjecture, correctly interpreted only as the action of high tides. The first deposits had initially formed near the water line, and the more they grew, the more the bottom strata spread out in the course of time, almost up to the highest water level at flood-tide.

172 On the shell mounds cut into by the waves, we can see at a

/601 cont./

• 172 a glance their composition from top to bottom. The mussel shells lie on top of each other in layers mixed with a little sand and, in some places, with layers of ashes. Near the bottom and also embedded in somewhat high layers, one sees a thin breccia stratum, five to 35 centimeters thick. Its origin cannot be explained simply as pressure from the superimposed material (394). More

394. Lothrop (b):179 has expressed himself similarly, "that the shells have in places solidified into a breccia, which forms a floor a foot or so in thickness. These spots occur sporadically and at no uniform depth, and it was impossible to determine the special conditions which had given rise to them" /cited in English/.

[182]

Fig. 72. Shell Heaps near Puerto Mejillones and Puerto Piedra.

convincing is /602/ the suggestion that individual layers of shells were exposed to strong heat from the hut fire, which made them brittle, and that later the human foot often walked over them, crushing them still more. The same depression in a shell layer

/602 cont./

• 172 was used time and time again for the fire (398) until it, too, be-

398. To interpret these as ovens in the ground, as "estufa de tierra," as Vignati (c):120 does, is obviously misleading.

came somewhat raised with the general growth of the entire mound. Everywhere we come across large and small stones which were used in some way without being worked. They served as a base for the glowing embers or as hammers. Less frequently we find stone points and stone knives which even the earliest Yamana always made in small dimensions.

The mass of animal remains which make up the mounds belongs to exactly the same species (399) from which the present-

399. In a shell heap along the central western shore of Bahía Harberton, Lothrop (b):183 found that "at a depth of a little more than a foot appeared a type of mussel-shell which could not be found on the beach locally" /cited in English/. He does not think that the appearance of this particular type which, unfortunately, he does not in any way describe, has any particular significance. I did not come across it.

day Yamana nourish themselves. The shells of *ʃ̌ɔuf* (Mytilus chilensis) and *hɛ́ɛʃɛn* (Mytilus edulis) are by far more numerous than those of Patella, Fissurella and Trophon, Solen and Pecten, as well as small pieces of the shell of the sea-urchin *kʰíl'* (Echinus) and the large Voluta mail, *hɔ́ʃ'ɔn*. Mixed with these are bones of animals, most of which come from seals and the indigenous marine birds. As may be expected, particularly the bone remains in the lower strata are poorly preserved; they often disintegrate at the slightest touch (397). Here we see the destructive influence

397. Lothrop (b):196 is mistaken if he thinks that "in Tierra del Fuego the

/802 cont./

•172

foot scarcely leaves the ground" /cited in English/, and that therefore the bone remnants would be better preserved. The greater or lesser presence of air is a much more important factor in preservation.

of freezing and thawing to which these organic structures are exposed more than any other things. All the finds mentioned above unfold the picture of an animal world that still inhabits this region today.

The remains of human skeletons are less often found in these shell strata; occasionally they are uncovered by natural forces themselves. It is well known that the Yamana formerly burned their corpses in their own huts and afterwards buried the bone parts on the spot. It cannot be proved, but it is almost certain that they also buried the entire corpse in a shell mound without first cremating it. Unfortunately only an extremely small number of remains of human skeletons from the shell mounds have been gathered and accurately described scientifically. I know of only two skulls uncovered in the "Conchales de Ushuaia" and described by Vignati (c):181. /803/ He did not examine the corresponding skeletons. Exact measurements were not made of the skulls either, but the descriptions and illustrations leave no doubt that these specimens can definitely be assigned to two members of the Yamana tribe (308).

308. Vignati's (c):138 own opinion is that the characteristics found, "in summary, authorize one to suppose that both creatures are from Yahgan, such as are familiar to us through the descriptions by Flower, Gusinde, Hyades, etc." /translated from Spanish/.

Judging such remains is more difficult because one can probably never determine definitely whether the find goes back many centuries or only a few decades. The uniform construction of the shell mounds warrants only to a certain extent the inference that the remains more deeply buried are older. Hence the fact that skeletal remains are found somewhere in the lowest strata of a

/603 cont./

• 172 shell mound is not sufficient evidence to permit us to postulate an older or more recent racial type within the total Yamana group (399).

399. Some data are completely useless because they are too indefinite. A case in point is those of Lovisato (b):101 on shell heaps at Pictón Island, "in which, together with unusually large human skeletons, were found two arrowpoints of ordinary size and completely identical with those of the Patagonian paraderos" /translated from Italian/.

For comparison we give here a description that Spencer:59 furnished on May 11, 1929: "Spent afternoon searching on kitchen middens beside the Rio Douglas, and found large black somewhat coarsely chipped arrow, or spear head (?), lying among big cobble stones on river bank, and scrapers. Present-day Yahgans do not use these. Middens evidently very old, with enormous mass of shells, mainly mussels with limpets, barnacles, volutes, etc., seal and whale bones; of damp black earth, with beech trees, some quite twenty feet high, which have grown up on top of these middens since they were made and used (400);

400. This cannot be regarded as a rare phenomenon, because it occurs in various places. It does not in the least help to determine the age of the shell heaps. Compare Lothrop (b):194.

all middens overgrown by grass" /cited in English/. Of the same spot he says on May 20: "Claude Williams dug out one side of kitchen midden. Six of these formed a kind of semi-circle with open side towards the sea. Each one had depression in middle; longest being [perhaps 18] (401) feet in diameter and six feet

401. Miss Hamilton's memory. Mr. Williams writes to her that the average

/803 cont./

• 172

grave depression is six feet in diameter, and from three to four feet deep (ibid.) /cited in English/.

high. Looked as if natives camped in the middle with fires all round them. One mass of shells and black earth with layers of calcined pinkish earth. Mussel shells predominated, but large numbers of Fissurellas and Patellas and Modiola-like shells and Volutes. Bird bones, apparently gannet, seal bones, and whale bones. Very few stones, and no sign of any chipped ones. Single bone harpoon" /cited in English/. The shell heaps on Isla Elisabeth in the eastern Strait of Magellan were compared by Lovisato (b):102 with the "Conchales de Ushuaia": "These are not such marvels; they do not rise as high above sea level and on casual inspection might be called true dunes or skillfully made entrenchments. /604/ Besides the innumerable mollusk shells of Mytilus and Patella genera and bones of otaria, eared seals, and otters, there are fragments of crabs, of pettini, and of other bivalves. On the grassy carpet that has grown over these deposits stand the actual kitchen middens, with related wigwam, that are simple cumuli belonging to each wigwam, but cumuli of only cockle and Patella shells with the remains of crabs or a very few mammal bones" /translated from Italian/.

The shell heaps are easy to recognize even from a distance. Usually they are covered in patches with only individual malin or with small, sparse clumps of grass. Herbs and low shrubs do not thrive on the porous, loose subsoil. The largely bare surface has a peculiar pearl-gray color, which contrasts sharply with the dark humus ground, the yellow gravel, and the grayish-white stones surrounding each of these shell heaps.

2. The Embedded Implements

Although the sparse skeletal finds do not permit a definite judgment about the racial character of the earlier settlers, the implements that were brought to light clearly indicate that the former style of life coincides exactly with that of today. The

/604 cont./

•172 shell heaps, luminous, as such are good proof of this, while the worked tools bestows it to the point of absolute certainty.

In numbers, the worked blades head the list. They evidently served as knives, since they are flat, usually longish and leaf-shaped with blunt points, and sharpened along the entire edge. A shallow notch that is sometimes visible indicates hafting. Another shape is more like a chisel, the cutting edge being almost straight and the entire piece tapering laterally toward the back which was forced into a wooden handle. The tool used by the present-day Yamana makes this inference plausible (see a description of it, p. 188, and Fig. 46).

In the same category belongs the triangular shape taken from the shell heap at Ushuaia, a single specimen of which Vignati (c):121 illustrates and calls "lámina embotada" /Spanish, "blunt strip"/. It is not fully preserved, but it still measures 8.2 centimeters in length and 3.1 centimeters at its thickest point.

Lance-points or dagger and arrow points are uncovered relatively often. Their shape unmistakably coincides with the stone points to be found in the old sites of the Selk'nam (Vol. I, 281). They come either in the shape of a triangle with a wide base line gently curved inward, or an extended triangle with sharp corners pointing downward between which a short projection protrudes (602), or finally /605/ the rarer type with a wide projection

602. Hyades (q):414 gives examples of these two forms, illustrated on Plate III, which he describes as "flint arrowheads found in the old shell heaps at Ushuaia" /translated from French/. The same three pieces are reproduced in Hyades (b):36.

tapering at the bottom (Fig. 72) (603). The two shapes of these

603. Vignati (c):123 defines this shape on the basis of two specimens and calls it "puntas doblen." The two specimens are 7.2 and 6.6 centimeters long.

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• 172 few mentioned were used by the Yamana until a few decades ago. They are still made today of glass by aged, experienced men, but these are usually smaller than the old ones which are as much as ten centimeters long (404). Lothrop (b):191 regards the long triangu-

404. I find it inexplicable that Hyades (b):34, in view of the finds just mentioned, maintains: "Certainly this model has not been used for a long time among the Yahgans" /translated from French/.

lar form with the pointed lateral notches and with a short middle projection as "the dominant Beagle Channel type" /cited in English/.

Fig. 73. Dagger Points and Arrow Points. Natural size.

but he overlooks the fact that it is also found in the region of the Beli'nam (Vol. I, 363). /Fig. 73 appears here./ Among these shapes two noticeably dissimilar sizes are to be distinguished, namely, those of about six to ten centimeters and those of about two and a half to three centimeters (405). There was, besides, a single specimen

405. Vignati (c):134 regards the nine specimens from the shell heap at Ushuaia as "careful and perfect work, obtained by pressure flaking. All

/605 cont./

but one belong to the type of arrowpoint with wings /Spanish, aletas/, with two distinct sizes. The winged /Spanish, aletiformes/ type is known in Tierra del Fuego and Patagonia" /translated from Spanish/.

with a very broad projection, which Vignati (c):124 calls "pedunculado" and which resembles many specimens from Patagonia (Fig. 74).

Apparently the Yamana in the distant past used stone scrapers little or not at all. They preferred a simple mussel shell without a haft because this was very easy to /606/ obtain and to sharpen at any time. We seldom find a stone scraper in the shell mounds. I never saw one, and Fred Lawrence could not remember having seen them either. The three specimens Lothrop (b):190 found in Bahía Harberton seemed unknown to his informants, although Guillermo Bridges contradicted this (Fig. 73). It is possible that they originated among the Selk'nam or as a result of their influence on the Yamana. Until further finds are brought to light, any discussion about it is fruitless. /Fig. 74 appears here./ I cannot but suspect, however, that the persons who picked up stone arrowpoints on the shell mounds either did not recognize actual scrapers as tools or did not appraise them.

Another strange object is a stone borer ("perforador") 4.8 centimeters long from the shell mound at Usbuais. On a trapezoid-shaped lower part rises the evenly fashioned needle (Fig. 74). This type is not rare in Patagonia; I also found it on the shore of Useless Bay (Vol. I, 261). Compare Vignati (c):124.

Finally we must mention the numerous stone hammers which show no shaping but unmistakably indicate that they were used. These are oval cobble-stones which the sea itself has shaped and which the present-day Yamana still use very often, either to break open hollow cylindrical bones, to beat leather, or to make larger implements (606). It is strange that Vignati (c) does not

606. Lothrop (b):192 calls these pieces "Hammerstones, anvils, grease stones" and adds, "Every family carried an oval

• 172

/606 cont./
water-worn stone which was used for a variety of purposes, such as hammering" /cited in English/.

report their presence in the shell heap at /607/ Ushuaia, since Lothrop (b):192 without exaggeration assures us that "these stones may be picked up at every ancient camp-site" /cited in English/. As a matter of fact, they are lying around everywhere and are especially conspicuous in those places undermined or eroded by the restless sea.

Sometimes the so-called perforated stones are referred to. They frequently appear in central Chile. In all of Tierra del Fuego only

Fig. 74. Various Stone Implements. Natural size.

two specimens of this type were picked up. For one of these we are indebted to Furlong (r):180, who expresses himself on the subject as follows: "Most important of my finds was one of the so-called 'morning star' stones. /Fig. 75 appears here./ This perforated stone, about four inches in diameter, has knobby projections around its rim" /cited in English/. I saw this piece in the American Museum of Natural History in New York. According to the finder's own interpretation, it served as "the head of a primitive war club" /cited in English/. He is justified in not attributing it to the Yamana; "it may help in establishing the fact of certain trade relations and communications between the ancestors of these people and tribes of the Chilean

/607 cont./

•172 coast" /cited in English/. Lovisato (c):723 brought the other specimen to Europe (compare also Colini:240), it having been given to him, as I learned, by the Reverend John Lawrence. Today it is in the Museum Kircherianum in Rome, is listed as Number 36901, and bears the inscription: "stone disk with hole in center; Yagan of Tierra del Fuego, Presented by Dr. G. Dall'orto, 1887" /translated from Italian/. To me this stone gave the impression of being a natural formation. Besides, John Lawrence and his sons assured me earlier that such pieces were never used by the Yamana. In case these perforated stones are really the work of human beings, we shall be obliged to regard

Fig. 75. Stone Scrapers. Natural size.

them as foreign imports (407) until new finds force us to give

407. Cooper:214 shares this view with Furlong (r):180. Compare in this connection Outes (a):437. On the mainland these perforated stones made by human beings are to be found in extensive areas.

another explanation.

/608/ The shell heaps furnish a large number of bone implements, in conformity with the present-day common use of this type. Perfect specimens, however, are rare, for obvious reasons (408). I, too, often came across fragments of notched

408. Without going into specific descriptions,

/608 cont./

•172 Lothrop (b):192 says very briefly: "Bone tools of modern type sometimes are found in shellheaps under conditions implying considerable antiquity" /cited in English/.

spear- and harpoon-points. From the "Conchal de Ushuaia" Vignati (c):125 illustrated and described in detail three harpoon points, three borers, two wedges (409), and two mussel openers.

409. Vignati (c):128 calls one of these "hacha" /ax/, the other "de uso desconocido" /use unknown/. For me both pieces are the bone wedges mentioned above that are used to remove bark.

We see so clearly in these pieces their absolute conformity with the bone tools still used by present-day Yamana that no one will raise any doubts about it. Proofs of their age are lacking, however, for we come across them even in the lower strata of shell heaps in various places in Yamana territory.

3. Their Origin

174 The repeated comparisons and references called forth by the description of the finds in the shell heaps have made us realize that in those places a form of culture is expressed in external objects and implements that coincides in essence and with surprising accuracy with the things we have observed among modern generations of the Yamana people. A nomadic people, unfamiliar with fixed dwellings, has built up this form of culture. That the search for food was undertaken by individual families is proved by the difference in height and extent of the settlement sites. The sea furnished at least the major portion of the food supply, for no trace of vegetable nutrients has hitherto been uncovered. Peculiarities of smaller areas are clearly shown in some of the middens; for example, in the east, especially in Bahía Harberton and in Puerto Mejillones, the number and size of the deposits is far greater

/609 cont./

174 The considerable number of points of agreement justifies the assumption that the original founders of the shell mounds are to be regarded as bearers of a way of life and a form of culture that do not differ from the Yamana of recent decades. Continuously, the undiversified picture of their culture runs through the earlier refuse-layers up to the top, upon which the Yamana of the present, like the earliest beginners, are engaged in continuing the construction of these shell heaps (411). It is this very uniformity

411. In spite of his striking reserve, Lothrop (b):183 must admit: "The shellheaps throw little light on the culture or antecedents of the Yahgan except for two points: It seems that no other people except the Yahgan ever occupied southern Fuegia. It seems that the Yahgan have lived there for a very long time" /cited in English/.

of design and execution in the implements that makes it impossible for us to see in them a succession of long intervals of time and to use them in order to determine certain strata, like the types in European prehistory.

• 172 171 Since, therefore, we cannot rely on a so-called series of types as a measure of time, the question arises whether the shell heaps in themselves permit any kind of decision about their age. The width and thickness of the layers plainly shows everyone at first glance that very many decades went into them; more, however, it does not reveal. A definite pointer is the noteworthy fact that in no single layer of these refuse heaps can we find definite objects or traces of European origin. On the other hand, we must note that for approximately a century the natives were given all kinds of things by Whites and these have come into everyday use. The bulk of these middens had therefore accumulated prior to that. In some places, it is true, the bulk has increased during the last hundred years, /610/ but this development cannot be compared with the earlier one because meanwhile the natives have decreased extraordinarily in numbers, because they have somewhat modified

2: Cooper E-4 (no date) 1946 SH6 Yahgan SH6

342 quently used toward the east, was tipi-form, with a framework of stiff stout saplings or tree trunks.

The ground in the interior of the hut was often, but not always, scooped out, to a depth of 2, 3, or more feet (0.6 to 1 m.) beneath the outside ground level, and was usually covered with a little grass or 354 some branches. The fire was made in the center. The huts had one door, facing the sea; or else two doors, one facing the sea, the other being opposite.

172 342 Archeological stratification in the *Yahgan* area of Navarino Island shows an earlier culture with shelters like those still used by the *Alacaluf*, oval in ground plan, having two entrances, and without scooped-out pits; and a later one with circular shelters having one entrance, and with pits 12 to 18 feet (4 to 6 m.) in diameter, scooped out in some cases to a depth of more than 3 feet (1 m.) (Bird, 1936, p. 261). The two historic types of *Yahgan* wigwam, oval and circular, unpitted and pitted, may thus represent two chronologically distinct cultures.

342 Larger and more substantial huts were built for initiation rites (q. v., infra); sometimes very small ones, for the use of children. The *Yahgan* also at times used caves or made a very rude shelter of a few branches tied together or stuck in the ground.

197 342 At the time of Lothrop's visit in 1924–25, practically all the then surviving *Yahgan* were accustomed to pass the winter months at Puerto Mejillones and Porto Piedra, on Navarino Island, in huts poorly constructed of ill-fitting boards (Lothrop, 1928, p. 189). Lothrop (1928, p. 131) considers the use of the wing of a large bird for 237 sweeping out the shelter to have probably been the result of missionary 356 influence.

DRESS AND ORNAMENTS

291 Clothing.—The chief garment, for men and women, was a small cape, of seal, sea-otter, or fox skin, sometimes of two or more skins sewn together—occasionally of bird skins—worn with the fur outside, covering the shoulder and breast or reaching to the waist, and held in place by a string across the chest. It was commonly shifted outdoors over the windward shoulder. Very frequently it was left off entirely. The women rarely if ever went without a small triangular pubic covering of bird skin or hide, held in place by a string attached to each upper corner and encircling the waist (pl. 33, *f*). No head covering was worn. Usually the *Yahgan* went barefoot, but sometimes when traveling or hunting on land they wore rather crudely made moccasins (fig. 12), resembling closely the *Ona* ones in pattern, of sealskin, with the hair outside, and stuffed inside with grass (cf. Lothrop, 1928, p. 134, photo). The eastern *Yahgan*, when hunting guanaco in winter, sometimes wore guanaco skin leggings, like the *Ona*, from whom they

2: Cooper E-4 (no date) 1946 SH6 Yahgan SH6

of several skins sewn together, was sometimes set up—a practice whose origin, native or European, is uncertain. (For details on manufacture and use of canoe, cf.: Lothrop, 1928, pp. 143–145; 1932 a, pp. 231–233; Gusinde, 1937, pp. 438–457.)

After about 1880 the *Yahgan* began to give up their traditional bark canoes, and to adopt the dugout. Still later, prior to Lothrop's visit in 1924–25, the dugout had been entirely superseded by the dory, of European type and origin.

The *Yahgan* never adopted the plank boat from their *Alacaluf* neighbors and never used rafts or skin-covered watercraft, so far as our records reveal.

MANUFACTURES

Pottery, weaving, and metallurgy were entirely absent; no traces of pottery have been discovered archeologically in *Yahgan* territory.

String-making and sewing.—Plant fibers, plain, shredded, or braided, were used in basket making, canoe sewing, and for mooring lines, respectively; braided whale sinew, for necklaces, fishing lines, and tool and weapon lashings; braided guanaco sinew, for bowstrings; whalebone, in sewing canoes and for bird snares and fishline nooses; seal-hide thongs, for tool and weapon lashings, harpoon lines, basket handles, mooring lines, and bowstrings. Awls were made of bone and wood, unhafted. The drill was lacking.

Basketry.—Four techniques in basket making were in use: (1) Simple half-hitch coiled, the commonest type (fig. 13, *top*); (2) twisted half-hitch coiled, rarer (fig. 13, *center*); (3) knotted half-hitch coiled, not common (fig. 13, *bottom*); (4) a sort of wrapped type. The first three were of excellent craftsmanship; the last, very crudely woven, and used only as a dip net for catching very small fish. The material for all four was a rush (*Juncus magellanicus*). The coiled baskets were more or less oblong-spheroid in shape, and had a carrying handle of thong or plaited rush (pl. 33, *c*).

Skin dressing.—No process of dressing proper is reported. Seal-skins were stretched on the ground, covered with grass and moss, and left so for a while, to help dehair them. Drying frames were apparently used. The scraper consisted of a mussel shell lashed to a cylindrical stone haft. The *Yahgan* made thongs flexible by drawing them through their teeth or by chewing them.

Stoneworking.—Little use of worked stone was made except for arrowheads and, rarely, scrapers. The workmanship was crude. Archeologically, there are some traces of stone pecking and polishing (Lothrop, 1928, p. 233; cf. Bird, 1938).

Containers.—Cylindrical buckets (pl. 33, *e*), of *Nothofagus betuloides* bark, for carrying and holding drinking water and for boiling, were made by the woman, with the use of a barking tool dif-

3: Lothrop E-5 (1924-1925) 1928
SH6 Yahgan SH6

PART II

CANOE INDIANS

THE YAHGAN

101 THE Yahgan Indians, the southernmost people in the world, lived on the southern shores of Tierra del Fuego from Brecknock peninsula to Spaniard harbor, and on the adjacent islands southward to Cape Horn itself (pl. IV). In spite of the tempestuous waters they confronted, they were a seafaring people and derived their livelihood almost entirely from the sea and its beaches.

172 Like the Ona, the Yahgan had to move freely and frequently in search of sustenance, but their camping-places were limited by the fact that each family was dependent on a fragile bark canoe, for which shelter must be provided. Thus favorable stretches of beach today are marked by great refuse-heaps, of most extraordinary size when one recalls that they represent only temporary stopping-places and that no family ever camped on a spot where it was known that a death had occurred. Centuries or even milleniums must have witnessed the building up of these vast agglomerations of bone and shell.

177 The Yahgan came under missionary influence in the middle of the nineteenth century, and a permanent mission station was 197 maintained among them from 1870 until recently. Hence their culture was much modified before they could be studied by trained ethnologists. For instance, by the eighties they had modified their initiation rites. We must add that among the Ona those without missionary training tended to survive the longest, but among the Yahgan the last survivors have almost invariably been mission reared.

142 Writing nearly a century ago, Fitzroy (pp. 137–139, 186) thus describes the untrammeled Yahgan of his day:

> The Tekeenica, natives of the south-eastern portion of Tierra del Fuego, are low of stature, ill-looking, and badly proportioned. Their color is that of very old mahogany, or rather between dark copper and

3: Lothrop E-5 (1924-1925) 1928
SH6 Yahgan SH6

Later Lõm took to the heavens and became the sun; his father, Taruwa Lõm, became a star (Venus?); his brother, Akainix, became the rainbow.

Several variants of the flood myth have been recorded in Yahgan-land. Koppers himself speaks of another version in which Laxu-wakipa, the ibex, in rage once sent a great cold spell so that vast quantities of snow fell. Later this all melted and a destructive flood followed. Cojazzi (1914, p. 31) records that among the central and eastern Yahgan they say the moon once fell in the sea. Hence the waters rose above everything but the loftiest mountain-peaks, where a few men and women took refuge with the animals. When the moon climbed back into the sky, the survivors descended and feasted on a dead whale that they found. Another version given by Cojazzi (*loc. cit.*) is that at the time of the flood Gable island became loose at the bottom and floated like a great ship, on which many were saved. According to Rev. Thomas Bridges (1884, p. 18) it was not the moon but the sun who fell in the sea and caused the flood.

THE ALACALUF

Of the Alacaluf, the second tribe of Canoe Indians found on Fuegian shores, only two members were seen by the writer. We therefore have no contribution to make on the Alacaluf. In general Alacaluf material culture was almost identical with that of the western Yahgan. They were, however, slightly better workmen than the Yahgan, so that at times their manufactures can be distinguished from those of their neighbors by the superior finish. For a useful summary of Alacaluf literature the reader is referred to Dr. Cooper's Bibliography.

ARCHEOLOGY OF SOUTHERN TIERRA DEL FUEGO

Camp-sites

The shores of Beagle channel are dotted with the refuse of former Yahgan camp-sites. Composed of ash, bone, stone, and shell, and partly denuded of vegetation, these middens can be recognized from afar by their peculiar pearl-gray color, which differs from the green-gray rock and the brown-gray soil. They are found in sheltered places, where there is a beach for landing, kelp off-shore for mooring canoes, and where water and firewood are readily available.

3: Lothrop E-5 (1924-1925) 1928
SH6 Yahgan SH6

Examination of the surfaces of the middens reveals on top a series of pits which represent house-sites (fig. 103). These pits are from ten to fifteen feet in diameter, anywhere up to six feet deep (two feet being an average figure), and are circular in outline. Within the pits are traces of inhabitation—hammers, grease stones, etc.—usually today half engulfed by grass. Sometimes house-sites can be determined by small circular patches of unusually luxuriant grass fertilized by refuse, where various utensils can be found.

Like the Ona, the Yahgan did not speak of the dead or camp on a spot where death was known to have occurred. So certain house-pits on any given site must at times have remained unoccupied during many decades until the memory of one who died there had passed. The other pits were occupied but intermittently by the ever-roving Yahgan. Rarely did they pass even a few weeks at any given spot. This factor makes difficult any attempt to estimate the age of these great shellheaps by calculating their cubic contents in relation to the probable number of inhabitants.

The seaward slopes of the middens are fronting the beach and stand so close to the waters that they are occasionally dashed with spray, and many are undercut by the waves for a foot or two at the base (pl. XVI). From this, slight submergence of the land since the heaps were commenced may be argued. As the shellheaps are really great terraces built out from rising ground toward the beach, the seaward slopes are steep. This steepness is increased by the undercutting of the waves, which often cause small landslides. Thus the vegetation is removed and large sections of refuse are exposed for examination as well as if trenches had been dug. At the same time the shells, bone, and ash brought down to the beach by erosion are carried away by the sea, but the heavier stone implements are left at the base of the exposed face where they may be readily gathered.

An interior feature frequently exposed by erosion is that the shells have in places solidified into a breccia, which forms a floor a foot or so in thickness. These spots occur sporadically and at no uniform depth, and it was impossible to determine the special conditions which had given rise to them.

It must be remembered that, as the Yahgan had no cooking-vessels, many of the shells in the refuse have been exposed to the action of fire and hence are calcined. From this it follows that they are very brittle and have been crushed by passing feet when

3: Lothrop E-5 (1924-1925) 1928

SH6 Yahgan SHb

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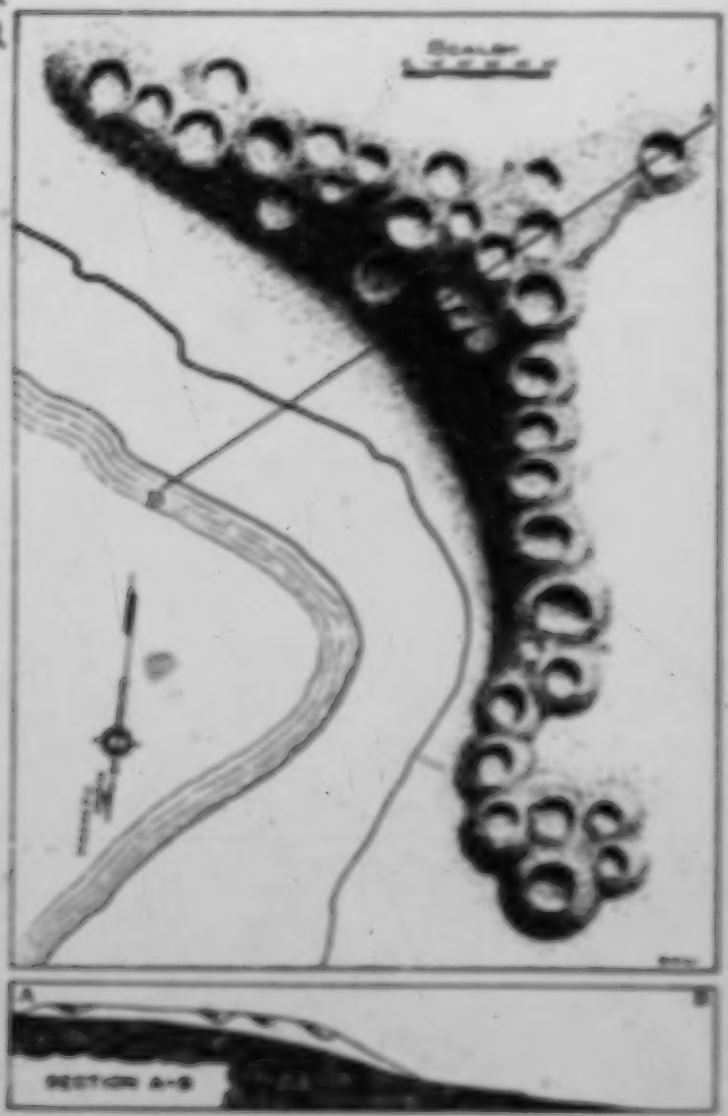

3: Lothrop E-5 (1924-1925) 1928
SH6 Tahgan SH6

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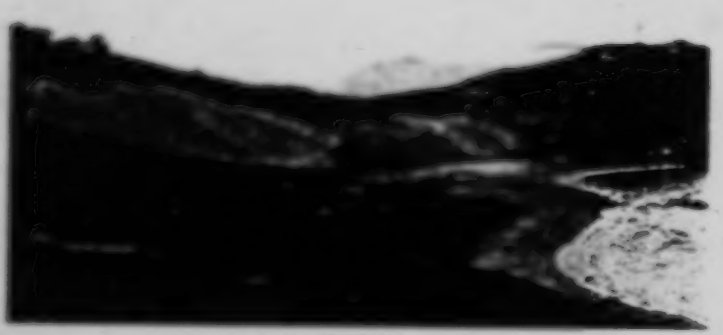

[p. 180-A]

3: Lothrop E-5 (1924-1925) 1928
SH6 Yahgan SH6

172 they were on the surface and perhaps again centuries later by the weight of the superposed débris. Any theory that the rotting of shells is due solely to age would therefore seem to be untenable.

As a typical example of a Beagle Channel shellheap we shall describe a site (No. 2 in fig. 98) at Harberton. The Yahgan called it *Wápaiatumdnakalaw*, meaning "the dead whale floated away," in reference to a long past yet tragic alimentary loss. A plan of this midden we show in fig. 96, while a photograph of the southern arm appears in fig. 97. As is usually the case, it stands just above the beach, here composed of shingle on which many shellfish can be picked up. The site fronts on a small cove facing eastward and thus is protected from the prevailing westerly winds and storms. The land has been cleared, but formerly the peninsula was forest-covered and supplied abundant firewood. There is now no water

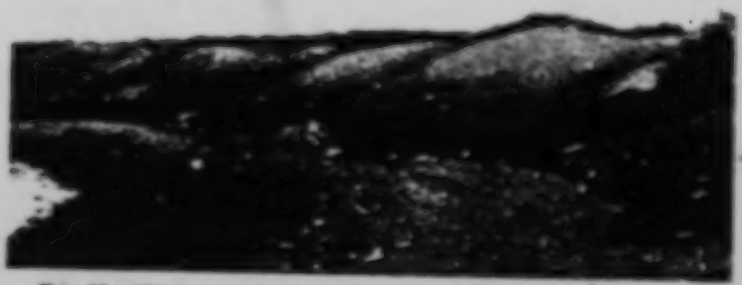

FIG. 97.—*Wápaiatumdnakalaw* shellheap, Harberton, Tierra del Fuego.

supply nearby, but there may have been a spring on the peninsula which has dried up since the trees were cut down.

The thirty-odd house-sites pitting the upper surface of the shellheap face the cove in an irregular line. They vary greatly in size, for it seems that some of them have been abandoned for many years and partly filled in. The southern arm of the midden appears to have been longest inhabited, because additional house-pits in front of the original line were placed in the rubbish as it was built out toward the sea. In some of the larger shellheaps as many as four or five rows of house-pits can be distinguished.

3: Lothrop E-5 (1924-1925) 1928
SH6 Yahgan SH6

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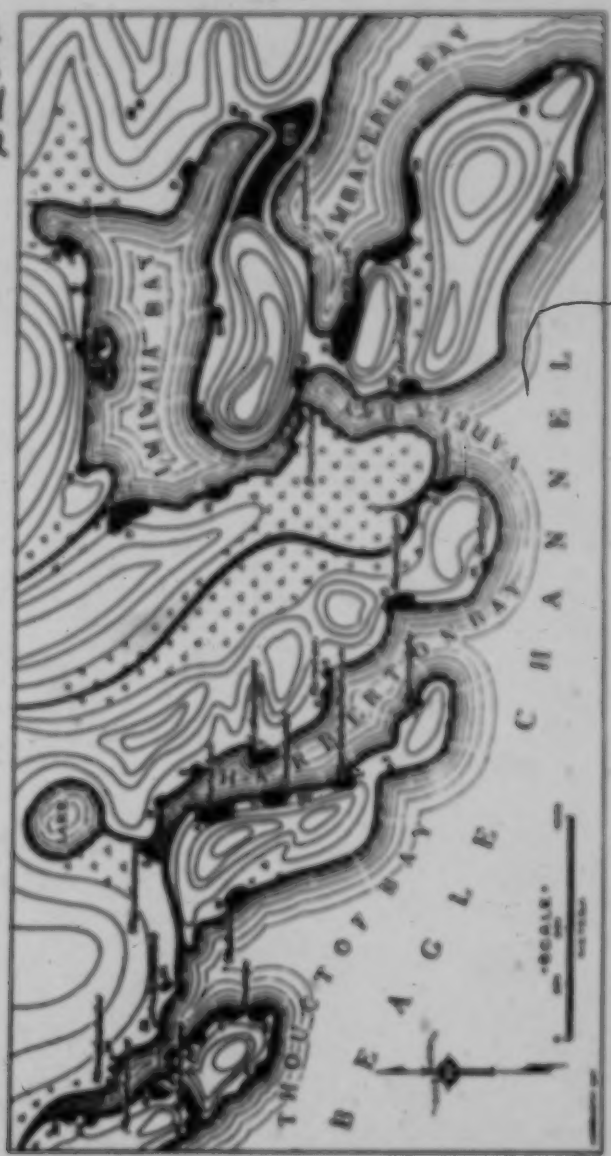

FIG. 88.—Geographic and place names near Harberton, Tierra del Fuego.

3: Lothrop E-5 (1924-1925) 1928
5316 Yahgan 5316

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Excavation of a test pit (just behind the bushes at the right edge of fig. 97) yielded the following results:

1. The interior shells were found to be as solid as those on the surface.
2. Finely powdered wood-ash had not been washed away, although the drainage was good.
3. At a depth of a little more than a foot appeared a type of mound-shell which could not be found on the beach locally. To this two great significances should not be attached, as it is well known that shellfish types migrate rapidly. Near San Julian in Patagonia the writer also found giant oyster-shells of a type not known locally.
4. Animal bones are common. At the bottom, long-bones, although wet and very cold (the frost often does not leave the ground till after Christmas), were as strong and sound as if only a year or two old. Vertebrae, ribs, scapulae, etc., on the other hand, were usually badly rotted and often crumbled at a touch.
5. No distinction between stone objects on the surface and in the interior of the mounds could be detected.
6. The shellheaps throw little light on the culture or ante-cedents of the Yahgan except for two points:

   a. It seems that no other people except the Yahgan ever occupied southern Fuegia.

   b. It seems that the Yahgan have lived there for a very long time.

On several sections of the coast of Beagle channel a careful examination of the shellheaps was made, because, while an individual mound might give no clue to the density and antiquity of the migratory population in pre-European times, it seemed that a group of mounds might do so. The districts thus studied were: (1) the adjacent Varela, Cambaceres, Ensenada, Harberton, and Thwaites bays; (2) the channels between Goble island and Tierra Mayor; (3) Puerto Mejillones and the vicinity on Navarin; (4) Ribalo bay on Navarin island. Other localities on Beagle channel or on the islands down to the Horn might equally well have been selected, but the above-mentioned places were convenient and accessible. The location of each shellheap was carefully plotted and an accurate count of the test-pits made at each site. These counts usually were made by two observers independently to insure their correctness.

Turning now to fig. 98, a map is shown which locates fifty-two shellheaps. In an air-line this map extends from east to west a little more than three miles, but the ever-curving shoreline causes

3: Lothrop E-5 (1924-1925) 1928
Yahgan SH6

approximately sixteen miles. Fresh water flows into all of these bays and is found in a pond on Cambaceres peninsula behind middens 29, 30, and 31; small springs are encountered in several places. Firewood is obtainable anywhere except on the marshes flanking the Varela river. Shellfish abound everywhere except in the upper part of Izquierdo bay. Excellent shelter in case of storms is amply provided, and, except in the roughest weather, it is possible to round the various peninsulas in a canoe owing to the heavy bands of kelp that encompass them all about. It is an ideal region for a people materially equipped to face life as were the Yahgan.

The number of house-pits counted—1215—indicates that the Yahgan fully appreciated the advantages of the district. The size of each individual camp-site is shown in the following table:

TABLE VI—YAHGAN CAMP-SITES AND HUTS NEAR HARBERTON

Camp-site	Number of Huts	Camp-site	Number of Huts
1	12	37	16+
2	35+	38	12+
3	7	39	26
4	60+	40	15
5	30+	41	114+
6	1	42	1
7	31	43	6+
8	9	44	24
9	2	45	12+
10	63	46	6
11	30+	47	1
12	1	48	1
13	42	49	10+
14	1	50	11
15	18	51	25+
16	15	52	9
17	15	53	24
18	9	54	28
19	1	55	37
20	9	56	6
21	18+	57	13
22	13	58	13
23	4	59	4
24	25+	60	25+
25	8	61	8
26	30+	62	4
		Total	1215+
		Average	23+

3: Lothrop E-5 (1924-1925) 1928
SH6 Yahgan SH6

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[p. 184-A]

3: Lothrop E-5 (1924-1925) 1928
S315 Yahgan S315

FIG. 99.—Approximate cross-section of shellheap 17, Lapataia Bay, Tierra del Fuego.

FIG. 100.—Location of shellheaps on the channel between Cable Island and Tierra del Fuego.

3: Lothrop E-5 (1924-1925) 1928
Sith Yahgan Sith

(72 361 The densest population in this group centered on Candelaria bay, where 307 hut-pits were counted. The camp-sites on the south side, known to the Indians as Yikirrh, display unusually deep house-pits, while Londobwala (pl. xvm, b) on the opposite

[62 63]

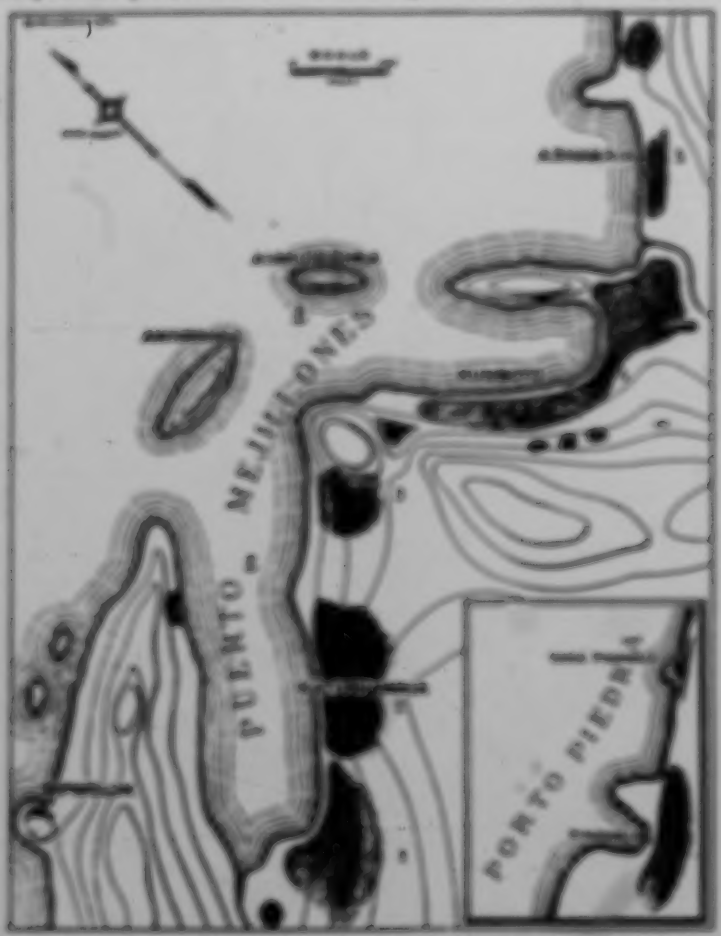

FIG. 103.—Puerto Mejillones and Puerto Piedra shell-heaps, Navarin island.

shore was evidently a later or less popular settlement, as the pits are relatively shallow.

731 About 1880 there occurred here one of those tragedies which must have been not uncommon among the Yahgan. A dead

3: Lothrop E-5 (1924-1925) 1928
5305 Yahgan 5305

whale floated ashore, and Ona and Haush came to join the local Yahgan in the ensuing feast. But all were poisoned by the meat and most of the company died—so many indeed that the survivors fled, leaving the bones of their relatives to whiten the beach for many years afterward.

Isniwata bay (pl. III, lower) is completely landlocked and the tide runs strongly through the narrow entrance. Hence it is not readily accessible. The large heap No. 22 (Lantahwala) lacks on it, but the principal access to this camp must have been from the Cambaceres side. In the northwest corner, however, there is a large and very deep midden (No. 17), of which we give a section in fig. 99. This is conveniently situated beside a small stream, and its approach from the entrance channel is sheltered from the prevailing westerly winds. Heap 31, on the north shore, was evidently abandoned long ago, as large beech-trees had grown on top of the refuse—the only case of this kind observed by the writer. The upper end of Isniwata bay is shallow and muddy, and not suited for camp-sites.

Harberton bay, the headquarters of the Bridges' sheep ranches on the south coast, is ideally suited for camp-sites, and no fewer than fifteen were inspected. Of these, No. 2, which has been described above (page 181), and Nos. 4, 5, 11, and 13, are large and important. No. 6 was occupied by Indians in the summer of 1923-24. This bay well illustrates the Yahgan tendency to give every few hundred yards of coast-line a separate name.

The Thwaites bay middens, although numerous, are for the greater part small, and offer no peculiarities.

The other groups of shellheaps examined differ in no material way from the Harberton cluster. In fig. 100 we show the settlements along the channel between Tierra Mayor and Goble island, a sheltered, well-watered, and well-wooded region, which affords a convenient resting place at the end of an exposed strip of coast to the westward. The size of some of the middens is as follows:

Camp-site	Meters or Feet	Camp-site	Meters or Feet
4	6	9	8
5	24	10	40
6	7	11	12
7	1	12	8
8	8	13	12

3: Lothrop E-5 (1924-1925) 1928
SH6 Yahgan SH6

Of these, No. 4 was occupied by the Yahgan during the summer of 1923-24. No. 10, seen in pl. XVI (upper view), was an unusually deep midden conveniently situated beside a spring.

Another group of Yahgan camp-sites, at Puerto Mejillones and at Porto Piedra along the coast to the westward, is seen in pl. XI and mapped in fig. 101. Here practically all the Yahgan now come to pass the winter months, living on the proceeds of the skins they have sold during the preceding summer or on their wages earned on various sheep ranches. They dwell in poorly constructed houses built of ill-fitting boards. The size of the shellheaps is as follows:

Camp-site	Number of Huts	Camp-site	Number of Huts
1	55	5	20
2	50	—	6
3	25	Pinawala	75
4	10	Yaka Pinawala	12

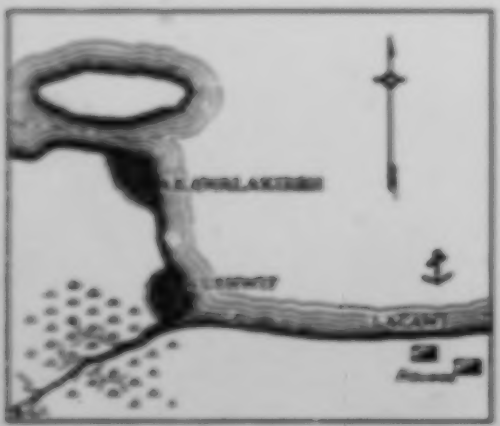

FIG. 102.—Ribalo bay, Navarin island, showing the location of shellheaps.

Puerto Mejillones really is one continuous site, and the original number of house-pits was much greater than that given above, but they have been trampled flat by cattle. The greatest depth of deposit was seen at site 2, where the débris appeared to be 12 or 15 feet thick (pls. XI, XVIII).

One of the Porto Piedra shellheaps is of unusual size. This site today is crowned by several modern houses and the house-pits have been trampled down by cattle.

At Ribalo bay of Navarin island are two large shellheaps containing 43 and 56 house-sites. The one called Akawalakirrh in

3: Lothrop E-5 (1924-1925) 1928
SH6 Yahgan SH6

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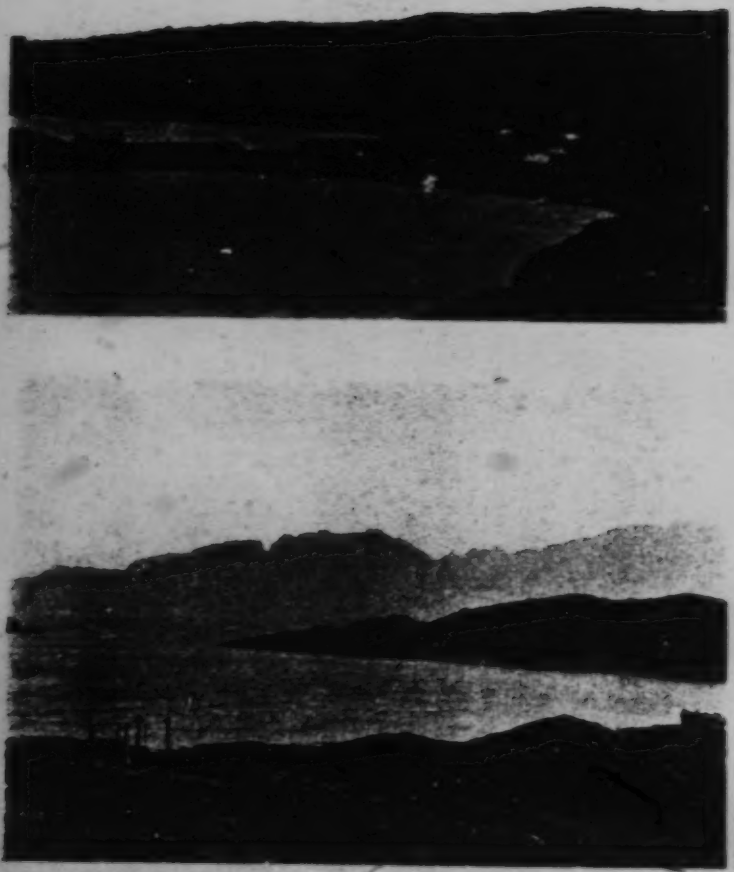

KUMBOTO SHELLHEAP, PUERTO MEJILLONES, NAVARIN ISLAND

[p. 188-A]

3: Lothrop E-5 (1924-1925) 1928
SH6 Yahgan SH6

172 fig. 102, pictured in fig. 103, is an exceptionally deep midden; it towers over the head, although situated on flat land. On the seaward side this heap has been undercut by the waves, which have exposed a large and solid layer of breccia near the bottom of the refuse.

FIG. 103.—Akawalakirrh shellheap, Róbalo bay.

ARCHEOLOGICAL FINDS

We have discussed at some length the nature of the Yahgan camp-sites and now must take up the very primitive remains to be found in their débris.

172 412 First, however, we should remark that the Yahgan, even today when metal tools are readily available, show a marked tendency to use anything which comes to hand, be it a shell fragment or a flint chip. Consequently, in the old days they must have accomplished much of their handiwork with such eolithic implements, and probably used their more formal tools principally for the arduous or very delicate tasks. This tendency is brought out by the small number of really well-wrought implements which have come from the middens in comparison with the comparatively great number of crude or half-finished ones.

The specimens illustrated were picked up on the seaward slope of various middens where the undercutting of the waves had

3: Lothrop E-5 (1924-1925) 1928
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disturbed the surface. In consequence there is no evidence from what level they had come originally.

1. KNIVES.—Chipped blades apparently intended for use as knives normally are leaf-shape, from two to five inches long, and, unlike the Ona knives, are worked on both sides. In pl. XIX, *a*, *b*, are shown two examples of large knives, each with a small nock near one end to assist in the hafting. Smaller blades appear in *c*, *d*, and *e* of the same plate; these may well have served as knives or conceivably might have been barbless tips for spear or arrow.

2. SCRAPERS.—Although two kinds of scrapers come from the shellheaps, neither is very common, probably because the Yahgan did most of their scraping with shell. In fig. 104, *a*, we show a

FIG. 104.—Scrapers from Wäpisatumánaknlum, Harberton, Tierra del Fuego. Length of *a*, 2¼ in. (14/3977)

disc scraper with a cutting edge completely encircling it. Fig. 104, *b* and *c*, both seem to be scraper-blades fashioned for hafting in the manner of the modern Ona flesher. One of them (*c*) has a recessed curve at one end of the blade; this may have been intended for cleaning bones, or possibly it served merely to give additional grip for the lashings.

The Yahgan with whom the writer came in contact denied that they had ever used this type of scraper. Mr. William Bridges however, stated that he had seen them employed, an assertion borne out by the discovery of these archeological specimens.

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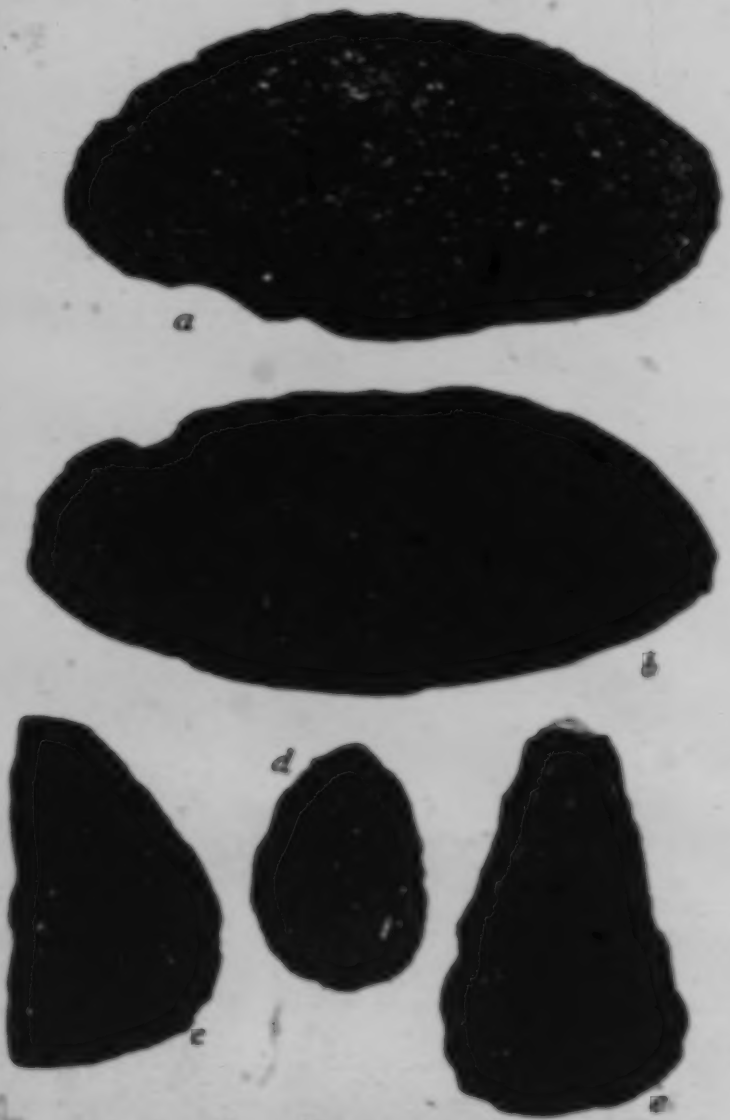

STONE BLADES, WÁPOATUSÁNAKULUK, HARBERTON, TIERRA DEL FUEGO

[p. 190-A]

3: Lothrop E-5 (1924-1925) 1928
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•172 412 3. SPEARPOINTS.—Four spear- or arrow-points are illustrated in fig. 185. Of these, *a* is a triangular blade with barbs but no tang,

FIG. 185.—Stone blades. *a*, Near Gable island (5/8544); *b*, *c*, Wigwam-midden, Harberton (14/3977); *d*, Ribbalo bay, Navarin island (14/6882). Length of *b*, 3 in.

while *b* has a tang but no barbs. However, *c* and *d* had both tang and barbs, and this seems to be the dominant Beagle Channel

3: Lothrop E-5 (1924-1925) 1928
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type, because several other specimens have been published by Bove (1883) and Hyades (1891). The general shape of these points is similar to that of modern Ona arrowpoints and ancient stone points from eastern Tierra del Fuego. Yahgan workmanship, on the whole, is cruder than Ona, and to the writer's knowledge no points have been found on the south coast equal to the delicate blade illustrated in fig. 40.

4. HAMMERSTONES, ANVILS, GREASE STONES.—Every Yahgan family carried an oval water-worn stone which was used for a variety of purposes, such as hammering. These stones (fig. 70) may be picked up at every ancient camp-site.

5. BONE TOOLS.—Bone tools of modern type sometimes are found in shellheaps under conditions implying considerable antiquity.

AGE OF ARCHEOLOGICAL REMAINS

The age of the archeological remains on Beagle channel is a problem that has intrigued the writer from the moment of his arrival there, and every effort was made to collect data for its solution. It should be frankly stated at the outset of this discussion that there is no exact answer, but it is nevertheless possible to deduce an approximate figure. There are several methods by which the problem may be attacked; thus we shall discuss (1) the variations in Yahgan speech, (2) known historical movements in other parts of South America, (3) the internal evidence of age in Fuegian shellheaps, and finally (4) their probable rate of accumulation.

1. ANTIQUITY OF THE YAHGAN DIALECTS

As explained above, the Yahgan spoke five distinct though mutually intelligible dialects. This is rather surprising because (*a*) they were a roving people occupying only a small territory, (*b*) they were exogamous, and (*c*) the total population was only about 3000 individuals. Assuming, as seems probable, that the Yahgan reached Tierra del Fuego more or less as a unit speaking a single tongue, how long did it take them to modify their language in five distinct ways?

In the more civilized parts of the world linguistic change also has taken place, and, because language is not only spoken but written, the archaic forms are preserved and can be studied. For instance, the breaking up of Latin into the modern Romance

3: Lothrop E-5 (1924-1925) 1928
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174 studies clearly prove this. Cooper (1917a) has pointed out the general resemblance of the earlier culture at such sites as Taltal with the historic culture of the Magellanic archipelago. He lists as features shared in common with the Canoe Indians: the use of spear and harpoon, and disuse of the bow, nets, coiled basketry, combs, shell necklaces, and supine burial. To this should be added the strikingly close resemblance in physical type. Granted this relationship, however, we lack sufficient evidence to translate it into historical terms, for we cannot say how long ago the Araucanians displaced the earlier culture. Possibly the change in population in coastal Peru pushed the Yahgan into Tierra del Fuego, while a later shift on the coast of Chile may have been responsible for the presence of the Alacaluf; but this is mere conjecture.

3. INTERNAL EVIDENCE OF AGE IN FUEGIAN SHELLHEAPS

172 For several reasons an inspection of Beagle channel shellheaps leads to the conclusion that they mark camp-sites inhabited for many centuries. We list these reasons as follows:

A. *Bulk.*—The first and most obvious sign of age is the very size of the refuse-heaps. Clearly it must have taken a great many centuries to deposit such vast masses of débris. Below we have attempted to calculate the cubic contents of the refuse near Harberton.

B. *Breccia.*—The formation of breccia in the lower levels of middens, to the writer is not a positive criterion of great age, because so little is understood of the reasons which cause shells to unite in a solid mass. If some climatic change of temporary nature caused the formation of hard floors at one time in all shellheaps, then a valuable means of determining relative age would be available, because the depth of the breccia varies.

C. *Trees.*—In one instance, shellmound 51 in fig. 98, large trees were found growing on top of an ancient camp-site. This midden was discovered on the afternoon before our departure for the north, so that there was no opportunity for cutting down a tree to count the rings and thus learn how long ago the site was abandoned. The site is a small one, with only eight house-pits situated at the base of a steep slope rising sharply from the beach.

D. *Land Subsidence.*—Many instances of the undercutting of the base of middens on both shores of Beagle channel (as can be seen

3: Lothrop E-5 (1924-1925) 1928
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in pl. XVI) seem to indicate slight submergence of the land since the first settlement. This conclusion is not in agreement with that of Loviseto (1885), who believes that the Elizabeth Island shellheaps have been elevated several meters. N. O. G. Nordenskjöld concludes that Tierra del Fuego has risen about sixty meters since relieved from the pressure of general glaciation. The slight and recent submergence noted by the present writer may be a local adjustment since the general rising of the land.

E. *Animal Bones.*—Considerable age may be argued from the presence of badly rotted animal bones in a Harberton shellheap. In general this is an almost worthless criterion of age, but in Tierra del Fuego, where the frost scarcely leaves the ground, all animal remains tend to be preserved. The body of a sailor buried in the South Shetland islands was exhumed after several years with the flesh in perfect preservation,[1] so that Beagle channel is only 400 miles from land where animal remains do not decay at all.

4. RATE OF ACCUMULATION OF REFUSE-HEAPS

Mr. N. C. Nelson[2] has most ingeniously worked out the probable age of California shellheaps by determining three factors: (*a*) the total former population, (*b*) the bulk of the débris, and (*c*) the probable daily rate of deposit. While lacking the concrete data to apply this method of determining age as accurately as has Nelson, nevertheless we shall persist with it, because a definite figure can be reached by this method, a figure not incompatible with criteria for age already discussed. We therefore shall examine the three factors above enumerated, which are not without interest in themselves.

Nelson's estimate of the total population was simply obtained, because he dealt with a permanent village-site. In Tierra del Fuego, however, no site was occupied for more than a brief period at a time, so the population of any camp or even the portion of the year it was occupied cannot be exactly determined. Yet, although the Yahgan were rovers, they wandered in rather fixed limits, hence the number of inhabitants for an area might be calculated in relation to the food supply.

Nelson assumed that each Californian family consists of six individuals. This number might be thought too large for the

[1] *Geographical Journal*, pp. 65–66, London, 1830.
[2] Shellmounds of the San Francisco Bay region; *Univ. Calif. Pub. Amer. Archaeol. and Ethnol.*, VII, no. 4, p. 345.

3: Lothrop E-5 (1924-1925) 1928
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total population of the south coast of Tierra del Fuego resided there. The true figure probably falls between these limits, so we may continue to assume that the average population of Varela, Harberton, Thouctof, Cambaceres, and Imiwaia bays was between 144 and 288 individuals.

To measure the volume of shellheaps accurately would be an endless task. However, the average house-pit with its adjacent share of débris, on the basis of exact measurements, covers approximately 570 square feet. The average depth of deposit runs about two feet, so that each house-pit accounts for 1140 cubic feet of rubbish, and the 1215 house-pits on Thouctof, Harberton, Varela, and Imiwaia bays represent 1,385,100 cubic feet of deposited material.

In order to find the daily rate of deposit, Nelson assumed that each individual ate fifty shellfish a day. By trial he proved that 5000 shells, the daily allotment of 100 people, can be packed into 1200 cubic inches which may be raised to a cubic foot when ash, earth, and animal bones are added. These figures were worked out for California Indians, but we believe that they also will apply to the Yahgan, for if they ate less vegetal food they ate more meat, which would not greatly change the proportion of rubbish.

We may now state our problem and its answer succinctly as follows:

(a) Probable number of inhabitants: 144 to 288.
(b) Total contents of shellheaps: 1,385,100 cubic feet.
(c) Probable rate of deposit: 1.4 to 2.9 cubic feet per day.
(d) Number of years sites were inhabited: 1300 to 2600 years.

In criticism of the age deduced for the shellheaps we may point out that while no factor—even the number of heaps in the area discussed and the number of house-pits in those visited—is certain, nevertheless there is no reason that the errors should be cumulative. At any rate, the application of Nelson's method to Tierra del Fuego shows that it has been settled a very long time. To the writer it seems that the larger limit selected for the population is too great, and that the bulk of the shellheaps might well be considerably greater than estimated, because the assumed depth is certainly a very conservative figure.

In view of these figures and the other criteria for age already adduced, it seems not unwarranted to believe that the south coast of Tierra del Fuego has been occupied for 2000 years at least.